REMARKS

Claims 1-5, all the claims pending in the application, stand rejected. Claims 1 and 3 are amended to emphasize the processing of only lots having the requisite surface free energy.

The Examiner has agreed with Applicants argument regarding anticipation, and now turns to obviousness. The Examiner cites a technical journal article in support of a conclusion that it was well known to form and maintain glass products at a surface free energy of greater than or equal to 60 mJ/m^2. The article does not teach treatment of glass performs, nor treatment of preforms in lots.

Applicants have amended the claims to emphasize the processing of glass performs in lots.

Claim Rejections - 35 U.S.C. § 103

Claims 1 and 2 are rejected under 35 U.S.C. § 102(b) as being anticipated by Fujino (4,976,764) in view of Choi et al (J. Electrochemical Society, 149 (1) G8-G11 (2002)). This rejection is traversed for at least the following reasons.

The invention is focused on a method in which entire lots of a preformed glass material having a surface free energy of greater than or equal to 60 mJ/m^2 is fed to a heat softening step and then fed to the press molding step. The preformed glass material is "washed" to achieve a surface free energy of greater than or equal to 60 mJ/m^2 for the entire lot. Each lot of preformed glass is subjected to precision cleaning followed by sampling inspection of surface free energy. Only lots with a minimum surface free energy of greater than or equal to 60mJ/m^2 are fed to the heat softening step. This feature of the invention is particularly effective for glass materials

tending to fuse, such as optical glasses with fluorophosphate, phosphate, borate and borophosphate materials having high reactivity with a molding surface.

Claim 1

Claim 1 is directed to such method of manufacturing a glass article comprising the steps of (1) heat softening the glass material that has been preformed, and (2) press molding the glass material with a pressing mold, where (3) each lot of preformed glass material is subjected to precision cleaning, a cleaned lot of glass material is subjected to sampling inspection of a surface free energy, and (4) a lot with minimum surface free energy levels of greater than or equal to 60 mJ/m2 is fed to the heat softening step, as described at several places in the specification, including page 10, lines 21 to 30.

Claim 2

This claim specifies that the cleaned preformed glass material is kept in an atmosphere that maintains a surface free energy of greater than or equal to 60 mJ/m^2 from after cleaning until the start of the heat softening step.

The clear focus of the invention is to provide a consistent surface free energy of greater than or equal to 60 mJ/m^2 for an entire lot.

Fujino

Applicants previously asserted that there is no teaching or suggestion in Fujino that a surface free energy greater than the stated threshold would be obtained, and such feature was not

inherent. Applicants argued that such limitation is not taught and would not be inherent, since the process in Fujino can result in glass material that has a surface energy less than 60 mJ/m^2.

Choi et al

The Examiner now looks to Choi et al for a teaching that it is common to obtain glass materials in commercial processes with surface energy greater than 60 mJ/m^2. The Examiner looks to Figs. 1a and 1b for support. Applicants respectfully submit that the teachings of Choi et al would not lead one skilled in the art to achieve the claimed invention for several reasons.

First, Choi et al is only concerned with improving anodic bonding between silicon and glass. Such purpose is substantially different from the molding of glass articles and would not lead to a modification of Fujino. There is no teaching or suggestion that a higher surface free energy of greater than or equal to 60 mJ/m^2, especially reliance on such value for determining the further processing of an entire lot, would be useful in an optical glass product process in Fujino.

Second, Choi et al is only concerned with glass substrates (page G8), and not performs for optical glass elements. The products listed by Choi et al include microsensors, SOI and fluid handling devices, but do not include optical glass elements.

Third, Choi et al does not teach processing in lots, particularly the steps related to inspection and further molding. Thus, Choi et al cannot make up for the deficiencies of Fujino and cannot lead one skilled in the art to modify Fujino to achieve the claimed invention.

Since neither Choi et al nor Fujino teach or suggest the lot-based steps now set forth in the amended claim 1, the claim should be patentable.

As to dependent claim 2, as argued in the previous amendment, nothing of this sort is taught in Fujino. Further, nothing of this sort is taught in Choi et al, since it does not concern glass performs. On the basis of the foregoing argument and amendment, and the dependency of claim 2 from claim 1, this rejection should be overcome.

Claims 3, 4 and 5 are rejected under 35 U.S.C. § 102(b) as being anticipated by Sato (5,851,252) in view of Choi et al (J. Electrochemical Society, 149 (1) G8-G11 (2002)). This rejection is traversed for at least the following reasons..

Claim 3

The subject matter of claim 3 is a method of manufacturing a glass article comprising heat softening the glass material that has been preformed and press molding of the preform glass material with a pressing mold, where a surface layer is formed on a preform glass material having a surface free energy of greater than or equal to 60 mJ/m^2. Thereafter, the preformed glass material is fed to the heat softening step and the press molding step.

As with claim 1, claim 3 is further limited by the present amendment to a method in which each lot of preformed glass material is subjected to precision cleaning, a cleaned lot of glass material is subjected to sampling inspection of a surface free energy, and only a lot with minimum surface free energy levels of greater than or equal to 60 mJ/ m^2 has a surface layer formed thereon, prior to being fed to the heat softening step. The claim is further amended to emphasize this selective feature.

Sato et al

The patent to Sato et al concerns a method of forming a mold release film on the surface of a glass blank from which an optical element is made by press molding, the film being a carbon film having a thickness of less than 50 Å, preferably less than 10 Å. The Examiner points to the teaching at col. 3, lines 17-29 for a description of the ashing technique using an oxygen plasma, and asserts that this cleaning method is capable of producing a surface free energy greater than or equal to 60 mJ/m^2, glass material. The Examiner points to the teachings with regard to the use of methane plasma to deposit carbon film at col. 3, lines 41-50 and to the use of inductive heating and press molding of a preform thereafter.

Again, there is no express teaching in Sato that the glass material preform with deposited surface layer has a surface free energy greater than or equal to 60 mJ/m^2. Such feature is not "inherent," notwithstanding the application of such cleaning and forming steps, because the disclosed process is not capable of producing such result or can produce other results. Moreover, such feature would not be obvious, since there is no art recognizing that such surface free energy value would be of benefit in inspecting and selecting glass performs in lots during a manufacturing operation.

The Examiner admits at page 6 of the Office Action that Sato is silent regarding subjecting the cleaned glass to a sampling inspection test after plasma treatment in order to ensure a minimum level of surface energy. Clearly, Sato does not teach the subject matter presently recited in the claims, including the treatment of the performs in lots in the cleaning, sampling and forming steps.

The Examiner asserts that such sampling process is routine quality control and that it would nave been obvious to modify Sato to have product surface energy testing. However, testing is not the issue, but testing in lots based on surface energy and then making a determination to further process based on the results is a new feature.

Thus, for at least two reasons, the claim is not anticipated, or even obvious in view of Sato.

Choi et al

For the several reasons given above with respect to claim 1, Choi et al would not render the invention obvious in view of Sato. Again, there is no teaching or suggestion that would lead one skilled in the art to test in lots during the process of Sato based on surface energy values, based on Choi et al.

Claim 4

Claim 4 specifies that the thin film is composed primarily of carbon with a film thickness of greater than or equal to 0.1 nm and less than or equal to 1 micrometer. This claim would be patentable for reasons given for claim 3.

Claim 5

Claim 5 specifies that the preform glass material is washed to achieve the surface energy and kept in an atmosphere that actually "maintains" a surface free energy of greater than or equal to 60 mJ/m^2 until the surface layer is formed. This makes it clear that the atmosphere is consistently maintained, rather than simply being "capable of maintaining" the surface energy

value. In addition, the staring point at which the cleaned preformed glass material is kept in an atmosphere that maintains a surface free energy of greater than or equal to 60 mJ/m^2.

Finally, the claim would be patentable for reasons given with respect to claim 3.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

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